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March 25, 1841.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

The following communications were read, viz.—

1. The reading of a paper entitled, “On the Localities affected by Hoar-frost, the peculiar currents of Air excited by it, and the Temperature during its occurrence at High and Low Stations.” By James Farquharson, LL.D., F.R.S., Minister of the Parish of Alford, was resumed and concluded.

The author states that he has been accustomed, for the last forty years, to make observations on the occurrence of hoar-frost, and the circumstances under which it takes place, with a view of obtaining a correct explanation of the causes of that phenomenon. It is well-known, he observes, that the localities chiefly affected with hoar-frost are the bottoms of valleys, and land-locked places of all kinds, whether natural or artificial. The altitude to which its effects reach on the sides of the valleys is dependent on the mean temperature of the day and night at the time of its occurrence: when that temperature is high, the lower places only are affected by the frost; but when low, the frost extends to much higher grounds. Hoar-frost occurs only during a calm state of the air, and when the sky is clear; but the stillness of the air in the bottoms of the valley is invariably accompanied by downward currents of air along all the sloping sides of the valley; and it is to this fact, first noticed by the author, that he wishes more particularly to direct the attention of the Society, as affording a decisive proof of the correctness of the views he entertains, being in accordance with the theory of Dr. Wells. He finds that after sunset, in all seasons of the year, and at all mean temperatures of the air, and whether or not the ground be covered with snow, whenever the sky is clear, although there may be a dead calm at the bottoms of the valleys, currents of air, more or less strong and steady, run downwards on the inclined lands, whatever may be their aspect with reference to the points of the compass. These currents are the result of the sudden depression of temperature sustained by the surface of the earth in consequence of rapid radiation, by which the stratum of air in immediate contact with that surface, becoming specifically heavier by condensation, descends into the valley, and is replaced by air which has not been thus cooled, and which therefore prevents the formation of hoar-frost on the surface of these declivities.

2. “Term-Observations of Magnetic Observations, the Variation of the Magnetic Declination, Horizontal Intensity and Inclination at Prague; for June, July, September, and October 1840.” By Prof. Kreil. Communicated by S. Hunter Christie, Esq., Sec. R.S.

3. “Term-Observations of the Variation of the Magnetic Declination, Horizontal Intensity and Inclination at Milan; for June 1840.” By Francesco Carlini, For. Memb. R.S.. Director of the Observatory.